



ELSEVIER

Contents lists available at [ScienceDirect](http://ScienceDirect.com)

## International Journal of Disaster Risk Reduction

journal homepage: [www.elsevier.com/locate/ijdr](http://www.elsevier.com/locate/ijdr)

## Review Article

## A review of informal volunteerism in emergencies and disasters: Definition, opportunities and challenges

Joshua Whittaker<sup>a,b,\*</sup>, Blythe McLennan<sup>a,b</sup>, John Handmer<sup>a,b</sup><sup>a</sup> Centre for Risk and Community Safety, School of Mathematical and Geospatial Sciences, RMIT University, Australia<sup>b</sup> Bushfire and Natural Hazards Cooperative Research Centre, Australia

## ARTICLE INFO

## Article history:

Received 24 February 2015

Received in revised form

15 July 2015

Accepted 15 July 2015

Available online 17 July 2015

## Keywords:

Emergency

Disaster

Citizen action

Emergence

Informal volunteerism

Resilience

## ABSTRACT

Despite highly specialised and capable emergency management systems, ordinary citizens are usually first on the scene in an emergency or disaster, and remain long after official services have ceased. Citizens often play vital roles in helping those affected to respond and recover, and can provide invaluable assistance to official agencies. However, in most developed countries, emergency and disaster management relies largely on a workforce of professionals and, to varying degrees, volunteers affiliated with official agencies. Those who work outside of such systems have tended to be viewed as a nuisance or liability, and their efforts are often undervalued. Given increasing disaster risk worldwide due to population growth, urban development and climate change, it is likely that 'informal' volunteers will provide much of the additional surge capacity required to respond to more frequent emergencies and disasters in the future. This paper considers the role of informal volunteers in emergency and disaster management. Definitions of volunteerism are reviewed and it is argued that there is an overemphasis on volunteering within, and for, state and formal organisations. We offer a broader definition of 'informal volunteerism' that recognises the many ways ordinary citizens volunteer their time, knowledge, skills and resources to help others in times of crisis. Two broad types of informal volunteerism are identified – emergent and extending – and the implications for emergency and disaster management are considered. Particular attention is given to increasing 'digital volunteerism' due to the greater accessibility of sophisticated but simple information and communication technologies. Culture and legal liability are identified as key barriers to greater participation of informal volunteers. We argue that more adaptive and inclusive models of emergency and disaster management are needed to harness the capacities and resilience that exist within and across communities.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Contents

1. Introduction	359
2. Citizen action in emergencies and disasters	359
3. Volunteerism in emergencies and disasters	360
3.1. Defining volunteerism	360
3.2. Volunteerism in emergencies and disasters	361
3.3. Defining 'informal volunteerism'	361
4. Informal volunteerism: types and roles	362
4.1. Emergent volunteerism	362
4.2. Extending volunteerism	363
4.3. Digital volunteerism: a new mode	364
5. Implications for emergency and disaster management	364
5.1. Cultures of emergency and disaster management	364
5.2. Safety and liability	365

\* Corresponding author at: Centre for Risk and Community Safety, School of Mathematical and Geospatial sciences, RMIT University, GPO Box 2476, Melbourne, Australia, 3001. Fax: +61 3 9925 2454.

E-mail address: [joshua.whittaker@gmail.com](mailto:joshua.whittaker@gmail.com) (J. Whittaker).

6. Conclusion: co-producing emergency and disaster management . . . . .	366
Acknowledgements: . . . . .	366
References . . . . .	366

## 1. Introduction

Despite highly specialised and capable emergency management systems, ordinary citizens are usually first on the scene in an emergency or disaster and remain long after official services have ceased. Citizens may play vital roles in helping those affected to respond and recover, and can provide invaluable assistance to official agencies. For example, following the 2009 ‘Black Saturday’ bushfires in Victoria, Australia, citizens responded to farmers’ calls for help to rebuild farm fences. The success of these efforts led to the formation of ‘BlazeAid’, a community organisation that rebuilds fences and provides support to rural communities affected by fire, flood and other hazards<sup>1</sup>. New technologies and social media have also enabled citizens to participate in emergency and disaster management in new ways [35,55,38]. This was evident in March 2014 when 2.3 million people joined the search for missing Malaysian Airlines flight MH370 by scanning more than 24,000 square kilometres of satellite imagery uploaded to the Tomnod website [33].

Citizen participation is a key principle of disaster risk reduction and resilience building (e.g. [87,27,16,12]). However, in most developed countries, emergency and disaster management relies largely on a workforce of professionals and, to varying degrees, volunteers affiliated with official agencies [2]. Individuals and groups who work outside of this system have tended to be viewed as a nuisance or liability, and their efforts are often undervalued [34,41,77,83]. Given increasing disaster risk worldwide due to population growth, urban development and climate change [32], it is likely that ‘informal’ volunteers will provide much of the additional surge capacity required to respond to more frequent emergencies and disasters in the future.

This paper examines the role of informal volunteers in emergency and disaster management. It explores the ways ordinary citizens volunteer their time, knowledge, skills and resources to help others in times of crisis. A brief overview of research on citizen action in emergencies and disasters is provided, and definitions of volunteerism are examined and considered in the context of emergency and disaster management. We argue that less rigid definitions of volunteerism are needed to fully recognise and value citizen contributions in this space. The paper then identifies ‘emergent’ and ‘extending’ volunteerism as two main types of informal volunteerism and discusses the implications for emergency and disaster management. Particular attention is given to increasing ‘digital volunteerism’ resulting from greater accessibility and sophistication of information and communication technologies and changing preferences for volunteering. Culture and legal liability are identified as key barriers to greater participation of informal volunteers. We argue that more adaptive and inclusive models of emergency and disaster management are needed to harness the capacities and resilience that exist within and across communities, and that attempts to command and control citizen action are misguided and may be counterproductive.

## 2. Citizen action in emergencies and disasters

The roles played by citizens in emergency and disaster management are widely documented in disaster research. Research challenges the popular perception that disasters unleash chaos and disorganisation, with citizens becoming passive victims, panic-stricken, or engaging in antisocial behaviours such as looting. Rather, individuals and groups have generally been found to become more cohesive than in ‘normal’ times, commonly working together to overcome disaster-induced challenges (e.g. [34,41,64,77,83]). Sociological research in particular has provided important insights into collective behaviour and organisational responses to emergencies and disasters. A key contribution of this work is the documentation and analysis of emergent behaviours, groups and organisations in times of crisis (see [21]).

Early disaster studies examined the phenomenon of ‘convergence’, a process involving the informal movement of people, messages and equipment into disaster-affected areas [34,9]. Contrary to popular views of chaos and disorganisation, Fritz and Mathewson [34] observed that survivors tend to be more passive, cooperative and ‘subject to social control’ by emergency services than those who converge on the scene from the outside. More recently Kendra and Wachtendorf [47] identified seven types of ‘converger’ from responses to the 2001 World Trade Center disaster. These included: returnees; the anxious (seeking information about family and friends); helpers; the curious; exploiters; supporters (encouraging and expressing gratitude to emergency workers); and mourners and memorialisers. While motivations for the unaffected to enter disaster-affected areas vary, convergence can be expected to occur in most emergencies and disasters.

Despite most citizens’ good intentions, convergence can create problems and challenges for emergency managers. Auf der Heide [6] notes that hospitals and other emergency response organisations are often inundated by information requests and donations. Unsolicited donations may be inappropriate or unnecessary and require the expenditure of resources for their management or disposal [43]. This can impede emergency services’ work, particularly when transportation and communications infrastructure are overloaded. However, as Auf der Heide stresses, convergence is not always detrimental and ‘local authorities need to recognise that unsolicited volunteers will show up, and procedures must be developed for processing these volunteers and integrating them into the response’ ([6], p. 465).

Initial studies of convergence led to growing interest in collective behaviour and the role of community and other groups in emergency and disaster response. Researchers at the Disaster Research Centre (DRC) developed a fourfold typology of organised response to disasters based on a detailed examination of field studies [22,67]. The typology identifies four types of organisation based on a classification of tasks (regular and non-regular) and structure (old or new) (Table 1). *Type I – Established organisations* involve routine tasks performed through existing structures; for example, fire fighting performed by a state fire agency. *Type II – Expanding organisations* undertake regular tasks through new structures. These are typically volunteer associations or groups whose core activities are non-emergency related but have latent emergency functions. An example of an expanding organisation is the Salvation Army [75], which has a core mission ‘to feed, to clothe, to comfort, [and] to care’ for those in need, but historically

<sup>1</sup> See <http://www.blazeaid.com>.

**Table 1**  
The DRC typology of organised response to disasters [22].

		TASKS	
		Regular	Non-regular
STRUCTURE	Old	TYPE I: ESTABLISHED	TYPE III: EXTENDING
	New	TYPE II: EXPANDING	TYPE IV: EMERGENT

has become involved in disaster relief when needed. The ‘expansion’ occurs because people who are not involved in the organisation’s normal activities become active participants as the emergency function is activated, and the group takes on traditional but not everyday tasks. *Type III – Extending organisations* have established structures but take on new and unexpected functions during the emergency period. A logging company, for instance, might send bulldozer operators and equipment to help clear debris after a wildfire, while a sporting club or religious group might mobilise its members to deliver food and clothing to those who lost their home. Although extending organisations often work in conjunction with established and expanding organisations, they can present challenges because they do not come under the effective control of the latter. Finally, *Type IV – Emergent organisations* are groups with new structures and new tasks. They emerge when needs are not being met, or it is perceived that needs are not being met, by other organisations. Emergent groups often form during or immediately after the emergency period, before established and extending organisations arrive. These groups often play critical ‘first responder’ roles such as initial search and rescue, providing first aid to victims, and assessing damages and community needs. Like extending organisations, they can pose significant challenges for emergency managers [22]. The DRC typology provides a useful framework for understanding different types of emergency volunteering.

### 3. Volunteerism in emergencies and disasters

Despite the key roles ordinary people play in times of crisis, officials often consider their actions as somehow external to or separate from the formal emergency and disaster management system [77]. Professionals and volunteers with official agencies tend to be viewed as legitimate actors, while those who are not part of the system are often seen as illegitimate, impeding effective response, and requiring management. Ordinary people can obtain legitimacy by becoming part of the system, usually as an accredited or formally affiliated volunteer. This is apparent in agencies’ attempts to recruit (or incorporate) volunteers, for example, as volunteer firefighters (e.g. [18]), through Community Emergency Response Teams (e.g. [30]) and attempts to register unaffiliated volunteers prior to an emergency (e.g. [20]). In this section, definitions of volunteerism are reviewed. We argue that there has been a tendency to define volunteerism narrowly, largely excluding those who act independently of the state or formal organisations.

#### 3.1. Defining volunteerism

In simple terms, volunteering refers to ‘any activity in which time is given freely to benefit another person, group or organisation’ ([93], p. 215). In volunteerism research, the term is generally used to refer to activities that are non-obligatory (there is no contractual, familial or friendship obligation between the helper and the helped, nor coercion); undertaken for the benefit of others, society as a whole, or a specific organisation; unpaid;

and undertaken in an organised context [15,19,65,82,93,94]. Nevertheless, there is considerable debate as to what activities constitute volunteerism and who can be considered a volunteer.

Cnaan et al. [15] reviewed definitions of volunteerism across a range of sectors. Definitions varied according to an author or organisation’s position on four key dimensions: free choice; remuneration; structure; and intended beneficiaries. The strictest definitions held that volunteerism must: be entirely voluntary and entail no coercion; involve no reward or even personal interest in the voluntary activity; be undertaken through a formal organisation; and involve no relationship or similarities (e.g. ethnicity) between volunteers and beneficiaries. Broader definitions included activities that: involve degrees of coercion (e.g. volunteering as part of a school programme); remuneration below the value of work and services provided; are undertaken outside of formal organisations; involve people of similar backgrounds (e.g. ethnic, religious, gender or residential groups) and even volunteers as beneficiaries (e.g. self-help groups) [15]. Strict definitions are problematic because freedom of choice and the nature of rewards may be known only to volunteers (e.g. a person who volunteers out of a sense of religious or moral obligation, or to improve their job prospects). Furthermore, restricting volunteerism to activities undertaken through formal organisations obscures the enormous amount of work undertaken by people in countries and communities where formal, non-government organisations are absent or under-developed [85,94]. Moreover, in some cultures, western concepts of volunteering may be alien, with other understandings of helping behaviour dominant. Robinson and Williams ([72], p. 69), for example, explain that in Maori culture: ‘The idea of ‘public service’, which is not voluntary in the sense of being an optional activity, should be distinguished from volunteering carried out by choice. It is a function of citizenship, a requirement of belonging to a community. In the Maori community, it is a cultural obligation’. Similarly, Kerr et al. [49] note that cultural and linguistic differences mean that much volunteer-like activity in Australian Aboriginal and Torres Strait Islander communities ‘is generally not acknowledged, fails to attract both material support and wider recognition, is not formalised and operates within the community-accepted frames of reference particular to that community’. They argue that the concept of volunteering should be extended to include different meanings given to helping behaviour in order to recognise and appreciate the experiences of those who work outside of mainstream organisations and dominant paradigms.

Time commitment is another important dimension in volunteerism. Volunteering is commonly characterised as an activity where people ‘give their time’ (e.g. [95], p. 695) and is often delimited to activities that ‘extend over time’ ([82], p. 3) or are ‘long-term’ ([63], p. 646). For example, Penner defines volunteerism in terms of planned, long-term action: ‘people think and weigh their options before they make the decision to volunteer. In this respect volunteerism can be contrasted with bystander interventions, which are usually quite time limited’ ([63], p. 646). This distinction between bystander interventions and volunteering is based on an assumption that crisis situations provide limited opportunities for the types of deliberation that are apparently necessary for volunteerism. According to Snyder and Omoto ([82], p. 3), emergencies and disasters ‘... offer little opportunity for foresight and advance planning and usually demand immediate and instantaneous responses’. However, research reviewed in this paper (below) demonstrates that citizen responses to emergencies and disasters are usually deliberate and constitute much more than ‘bystander interventions’, even when time commitment is minimal.<sup>2</sup>

<sup>2</sup> The examples of bystander interventions that are commonly provided include actions such as ‘help given to the victim of an assault’ ([93], p. 216) and

### 3.2. Volunteerism in emergencies and disasters

Volunteerism has tended to be defined more broadly in emergency and disaster contexts. Definitions typically focus on volunteer activities and outcomes rather than volunteers' characteristics and motivations *per se*. For example, in an early paper on volunteerism in disaster situations, Shaskolsky ([78], p. 8) defined volunteerism as 'any act that is orientated to the direct or indirect service of some other person or thing regardless of whether or not such act serves the self-interest of the actor'. Similarly, Wolensky [96] argued that volunteerism has too often been defined in altruistic terms and in relation to higher-level needs such as learning, exploration and self-actualisation, meaning that voluntary activities motivated by self-interest, egoism and power are overlooked. Wolensky regards volunteerism as 'any monetarily uncompensated, wilful action, be it spontaneous or organised, oriented toward the protection and/or restoration of symbols, interests, people, or other high priority values of a personal or group nature' ([96], p. 35).

According to Shaskolsky [78] volunteerism takes four forms in disaster situations. *Anticipated individual volunteers* fulfil the general expectations of society on an individual basis, such as a doctor who comes to the aid of victims. *Anticipated organisation volunteers* are regularly associated with an organisation, such as a volunteer fire brigade or the Red Cross, and whose participation is expected and planned for. *Spontaneous individual volunteers* provide assistance as individuals, usually in the early stages of a disaster, for example in search and rescue activities. *Spontaneous organisation volunteers* place themselves at the service of an organisation only once an emergency or disaster has occurred. These volunteers may choose to: (a) help a regular disaster organisation; (b) formally create an *ad hoc* organisation for dealing with the circumstances of the specific disaster; (c) use their pre-existing, non-disaster organisation for disaster work; or (d) carry out disaster-related tasks within a loose, informal network.

In a similar vein, Wolensky [96] identified four types of 'post-impact' volunteerism. *Public interest emergent* volunteerism includes groups such as search and rescue crews, those who help clean up after disaster, and those who assist with shelter and housing efforts. Such volunteerism is considered altruistic due to volunteers' genuine concerns for human safety and community welfare. *Public interest organisational* volunteerism is considered communalistic as it involves regular and non-regular aid provided through emergency services, civil defence and other organisations that act in the interests of the entire community. *Private interest emergent* volunteerism involves citizen action and self-help groups that organise to protect their own interests following disaster. These groups are considered egoistic because they primarily serve members' interests. *Private interest organisational* volunteerism involves organisations such as churches, unions and clubs that provide assistance primarily to members. It is considered mutualistic because help is provided to people who share common characteristics and interests.

Emergency management agencies have tended to adopt more formal, operational definitions of volunteerism. For example, the US Federal Emergency Management Agency [29] defines a volunteer in the context of the National Incident Management System: 'a volunteer is any individual accepted to perform services by the lead agency (which has authority to accept volunteer services) when the individual performs services without promise, expectation, or receipt of compensation for services performed'.

Similarly, Emergency Management Australia<sup>3</sup> ([26], p. 114) defines a 'volunteer emergency worker' as someone who 'engages in emergency activity at the request (either directly or indirectly) or with the express or implied consent of the Chief Executive (however designated), or of a person acting with the authority of the Chief Executive of an agency to which either the State emergency response or recovery plan applies'. Such definitions place the volunteer within the ambit of formal emergency management systems, in which volunteers act in accordance with the legislation, policies and procedures of the organisations they are affiliated with. Participation that is invited or requested by an agency or some other authority may not be voluntary if there is a real or perceived obligation. Training and accreditation is often a key requirement of formal volunteering [11].

While most agencies retain these formal, operational definitions, the participation of 'unofficial', 'unaffiliated', 'informal' and 'spontaneous' volunteers is increasingly recognised. For example, the Australian Government's ([7], p. 5) *Spontaneous Volunteer Management Resource Kit* defines spontaneous volunteers as 'individuals or groups of people who seek or are invited to contribute their assistance during and/or after an event, and who are unaffiliated with any part of the existing official emergency management response and recovery system and may or may not have relevant training, skills or experience'. Similarly, FEMA [28] distinguishes between affiliated and unaffiliated volunteers, with the latter defined as 'individuals who offer to help or self-deploy to assist in emergency situations without fully coordinating their activities'. FEMA notes that although unaffiliated volunteers can be a significant resource, the lack of pre-established relationships with emergency management agencies can make it difficult to verify their training or credentials and match their skills to appropriate service areas. Despite this broadening perspective, most agencies are concerned with managing volunteers and integrating them into official responses.

### 3.3. Defining 'informal volunteerism'

Discussion thus far has highlighted the restrictive nature of definitions in volunteerism research and, to a lesser degree, in emergency and disaster management (see Table 2). Volunteerism has typically been defined in terms of deliberately chosen and planned, long-term activities that are undertaken through formal organisations. In emergency and disasters, volunteerism has tended to be defined in terms of participation in the activities of state or other organisations, with whom the volunteer is formally affiliated. Despite increasing recognition of the participation of unaffiliated or 'spontaneous' volunteers, most agencies are concerned with managing volunteers and integrating them into official responses. Such definitions exclude those who act independently of the state or formal organisations, and obscure much of the shorter-term, informal volunteering that occurs in times of crisis. Thus we challenge the assertion that volunteering must be long-term and undertaken through formal organisations, and argue for greater recognition and participation of informal volunteers.

In this paper, informal volunteerism refers to the activities of people who work outside of formal emergency and disaster management arrangements to help others who are at risk or are affected by emergencies and disasters. Such volunteerism may take place before, during or after an event. Informal volunteers may participate as individuals or as part of a group, on a short or longer-term basis, regularly or irregularly, and *in situ* or *ex situ*.

(footnote continued)

'helping a person who has fallen or has experienced some other kind of transitory problem' ([63], p. 46).

<sup>3</sup> Emergency Management Australia is a federal agency responsible for planning and coordinating governmental responses to emergencies and disasters.



**Table 2**  
Selected definitions of volunteerism.

In volunteerism research:
'Volunteering means any activity in which time is given freely to benefit another person, group or organisation' ([93], p. 215).
'Volunteerism has four important attributes... First, it is a planned action; people think and weigh their options before they make the decision to volunteer... Second, volunteerism is a long-term behaviour; most people who volunteer continue this activity for an extended period of time... Third... volunteering involves 'non-obligated' helping... [and fourth] it occurs within an organisational context' ([63], p. 646).
'Volunteerism refers to freely chosen and deliberate helping activities that extend over time, are engaged in without expectation of reward or other compensation and often through formal organisations, and that are performed on behalf of causes or individuals who desire assistance' ([82], p. 3).
In the emergency/disaster context:
'Volunteerism will be regarded as any act that is orientated to the direct or indirect service of some other person or thing regardless of whether or not such act serves the self-interest of the actor' ([78], p. 1).
'Volunteerism is thus defined as any monetarily uncompensated, wilful action, be it spontaneous or organized, oriented toward the protection and/or restoration of symbols, interests, people, or other high priority values of a personal or group nature' ([96], p. 35).
'A volunteer is any individual accepted to perform services by the lead agency (which has authority to accept volunteer services) when the individual performs services without promise, expectation, or receipt of compensation for the services performed' [29].
A 'volunteer emergency worker... engages in emergency activity at the request (either directly or indirectly) with the express of implied consent of the Chief Executive (however designated), or of a person acting with the authority of the Chief Executive of an agency which either the State emergency response or recovery plan applies' ([26], p. 114).
'Potential spontaneous volunteers are individuals or groups of people who seek or are invited to contribute their assistance during and/or after an event, who are unaffiliated with any part of the existing official emergency management response and recovery system and may or may not have relevant training, skills or experience' ([7], p. 5).
'Unaffiliated volunteers, also known as spontaneous volunteers, are individuals who offer to help or self-deploy to assist in emergency situations without fully coordinating their activities. They are considered 'unaffiliated' in that they are not part of a disaster relief organisation. Although unaffiliated volunteers can be significant resources, verifying their training or credentials and matching them with the appropriate services can be difficult' [28].

Their participation may be spontaneous and unplanned, or deliberate and carefully planned.

#### 4. Informal volunteerism: types and roles

There are many ways that citizens can participate in emergency and disaster management informally. In this section, two broad types of informal volunteerism are identified: 'emergent volunteerism' and 'extending volunteerism'. 'Digital volunteerism' is identified as a new mode of volunteering, driven by the increasing accessibility and sophistication of information and communication technologies, and may be emergent or extending.

##### 4.1. Emergent volunteerism

Emergent volunteerism involves new forms of volunteering that occur in response to unmet needs, whether perceived or real. Researchers and emergency managers have tended to focus on challenges associated with 'spontaneous' volunteers, usually once an emergency or disaster has begun (e.g. [8,17,31,51,76]). However, it is important to recognise that new forms of volunteerism may emerge beforehand, for example in prevention and preparedness activities, and may entail considerable deliberation, planning and

organisation [21,68,83]. For this reason, we prefer the term 'emergent'.

Cottrell ([17], p. 3) defines 'spontaneous' volunteers as 'those who seek to contribute on impulse – people who offer assistance following a disaster and who are not previously affiliated with recognised volunteer agencies and may or may not have relevant training, skills or experience'. Spontaneous volunteers' proximity to the emergency or disaster site means they often play critical roles in first response. For example, in the 1976 Tangshan earthquake in China as many as 300,000 people crawled out of the debris, with many going on to form rescue teams that saved 80 percent of those buried under the debris [61]. Other examples of spontaneous volunteers include youths who performed search and rescue operations following the 1985 Mexico City Earthquake [13] and the one million volunteers from Japan and abroad who came forward in response to the 1995 Kobe earthquake [79]. However, while spontaneous volunteerism should be expected and planned for, it cannot be relied upon. Helsoot and Ruitenber [41] document situations where trauma associated with mass fatalities has rendered citizens passive, and where cultural factors have led to nonresponse and a reliance on emergency services.

Improvisation and innovation are key features of emergent volunteerism. Extreme events often present unforeseen conditions and problems, requiring capacities to improvise and innovate [36]. Studies of improvisation and innovation in emergencies and disasters have tended to focus on formal organisations (e.g. [36,73,56,90]). However, Kendra and Wachtendorf ([48] p. 318) consider community innovation and disasters, noting that innovation is a capacity or process whereby a community '... does something new in the face of crisis, either a crisis that is potential or one that is realized'. Many innovative strategies and uses of resources occur in the response phase where urgent need overcomes most objections. The risk of maladaptive or suboptimal outcomes tends to be considered an acceptable risk due to the perceived urgency of taking action. The need for innovation tends to be less evident before disasters and after the immediate crisis period, which tends to result in greater disagreement about needs, possibilities, actions and consequences [48]. Consequently, emergent volunteerism is likely to occur in response to and in the immediate aftermath of emergencies and disasters, particularly when citizens believe that the needs of those affected are not being met by formal response organisations. An earlier study of emergence found that most groups lasted for only short periods of time, usually hours or days [83]. However, some groups may remain active over longer periods and some may develop into established organisations. Atsumi and Goltz [4], for instance, describe how some volunteers with experiences in the Kobe earthquake remained active in other disaster events, and how the Nippon Volunteer Network Active in Disaster (NVOAD) transitioned from an emergent to an established organisation following the Kobe earthquake.

Emergent volunteers often have 'real time', 'on-the-ground' views of the issues and problems people face, and can configure themselves and their responses to meet local needs. Unlike emergency services and other formal response organisations, they are rarely constrained by pre-established rules, strategies and technologies that may inhibit effective local response [31]. A study of the 1985 Mexico City earthquake found that the emergency response period was dominated by the activities of emergent organisations and involved a considerable amount of emergent behaviour [24]. These behaviours and organisations developed due to the lack of prior disaster planning and the challenges created by the earthquake, which exceeded the emergency response capabilities that were in place [71]. For example, in the absence of an official search and rescue service, a group of youths began crawling into collapsed buildings to reach people trapped inside. They

rescued hundreds of people, despite having no prior training, experience or equipment. The group, 'Topos de Tlatelolco', became formally organised in 1986 and has become a highly specialised and trained search and rescue organisation. The organisation, which remains independent but coordinates its activities with government agencies and other organisations, sent search and rescue teams to assist in responses to the 2009 L'Aquila earthquake in Italy and the 2010 Haiti earthquake [13].

More recently, the Student Volunteer Army formed to help clean up liquefaction following the 2010–2011 earthquake sequence in Christchurch, New Zealand [88]. Thousands of students joined the efforts, which also involved volunteers from farming communities known as the 'Farmy Army', which were widely publicised via social media. Volunteers expended an estimated \$1 million worth of labour within the first week and around 75,000 h over the course of their effort [88]. Similarly, BlazeAid formed in the aftermath of the 2009 'Black Saturday' bushfires in Victoria, Australia, to help farmers rebuild fences. The group was formed by two farmers who sought assistance from family, friends and local volunteers to clear debris and rebuild farm fences [91]. After rebuilding the fences within a week, they began to help others and the organisation was formed. BlazeAid invites people to volunteer for as little or as long as they like, holds Volunteer Workers insurance, and has a Code of Conduct that outlines the organisation's expectations in terms of health and safety, use and care of equipment, and volunteers' interactions with each other and recipients of help. The organisation has received considerable media coverage, political support and sponsorship from mostly private sector organisations and has expanded its activities to assist people affected by flood, cyclone and drought throughout Australia.

It is important to recognise that most emergent volunteerism is less visible and does not lead to ongoing, formal organisation. For example, Webber and Jones [91] note that 'informal volunteering' was common after the 'Black Saturday' bushfires, with local people helping those affected to shoot injured livestock, clear fallen trees, connect generators and build fences. Similarly, Smith et al. [81] describe the critical role played by ordinary Haitians who translated their language and culture to assist in the implementation of a disaster triage system following the 2010 earthquake. Moreover, as discussed earlier, different cultural understandings may mean that helping activities are not recognised as volunteering at all [72]. The potential benefits of utilising indigenous and other forms of local knowledge in emergency and disaster management are now widely recognised (e.g. [53,54,46,39]). For example, a study of the 2011 *Rena* oil spill in Maketū, New Zealand, attributed the success of the clean-up to Māori cultural values and knowledge, which local people often had to assert in the face of outside 'experts' who wanted to advise them ([80], p. 9).

Fernandez et al. [31] identify two main risks associated with spontaneous volunteers. The first involves the failure of emergency managers to effectively utilise volunteers, which creates potential for loss of life and injury, property damage and poor public perception of emergency/disaster response. The second is associated with the actions of untrained, uncoordinated volunteers, who may disrupt organised responses and reduce the resources available to those affected. For example, following the 1999 Golcuk earthquake in Turkey, which killed 17,000 people, emergency services' attempts to access the disaster area were hindered by a 32 km traffic jam caused by spontaneous volunteers [41]. There is also a risk that the actions of untrained and uncoordinated volunteers will cause harm to survivors, emergency responders, and volunteers themselves. Although untrained citizens saved around 800 victims in the 1985 Mexico City Earthquake, 100 rescuers died trying to save others [41]. Similarly, a lack of information about the toxicity and harmful effects of petroleum after the 2007 *Hebei Spirit* oil spill in South Korea

meant that many volunteers were not properly clothed and later suffered from skin diseases [44]. Risks to both safety and organisational responses were apparent following the 2001 terrorist attacks on the World Trade Center, which saw around 30,000 volunteers converge on New York City. Many of the initial volunteers who arrived at the scene to assist search and rescue operations were overwhelmed by the emotional impact of their activities. Liath ([51], p. 17) notes that without proper training and support, 'these volunteers can in turn become traumatised, and by becoming victims of the disaster, may require the very services that they sought to provide'.

#### 4.2. Extending volunteerism

Groups and organisations without emergency or disaster functions often extend their activities to volunteer in times of crisis. These volunteers are usually part of an existing community group such as a chamber of commerce, sporting club, religious group or service organisation. Like emergent volunteers who act as individuals or form a new group, these volunteers often have intimate understandings of local needs and can draw on existing networks and resources to meet them. In rural Australia, volunteers from organisations such as the Country Women's Association and Rotary International often play critical roles in relief and recovery by collecting and distributing donated food, clothing and other domestic goods. Sporting and recreational clubs may also play significant roles. For example, Four Wheel Drive clubs from across Victoria banded together to assist people who were affected by the 2009 Black Saturday bushfires. Demonstrating a high degree of cooperation and coordination, the clubs worked together to deliver caravans to families who had lost their homes, helped clear debris and damaged trees, re-fenced properties, delivered hay to farmers and ran supplies to volunteer fire brigades [89,92].

Corporate involvement in disaster response is becoming increasingly common as part of corporate social responsibility (CSR) [84]. Although research has largely focused on the role of donations [45,57,58,97], some studies have considered the role of corporate volunteers after disaster. Twigg [84] notes that many companies do not simply want to donate money in the aftermath of disaster and instead seek more active involvement. Many also recognise the changing expectations of employees, who seek more than monetary reward. Choong [14], for example, examined DHL Asia-Pacific (a global logistics company) employees' participation in a disaster response programme following the 2004 Indian Ocean Tsunami. Employees collected donations and helped to transport and deliver supplies to Tsunami affected areas. Company vehicles were used to transport tourists to safety in Phuket, Thailand, and volunteers were deployed to an Airport Emergency Team (an initiative of the World Economic Forum) in Colombo, Sri Lanka, to assist in the distribution of over 7000 t of relief supplies. The study found that CSR strategies are more likely to benefit from strong employee participation when activities are aligned with their corporate identity. DHL had the skills and resources to provide logistical support following the disaster, and empowered local managers and employees to determine their level of commitment. The company's involvement in disaster preparedness and response was formalised by a public-private partnership between the United Nations Development Programme (UNDP), Office for the Coordination of Humanitarian Affairs (OCHA) and Deutsche Post DHL [86]. Another example of corporate volunteerism facilitated through partnerships with a disaster relief organisation is the 'Ready When the Time Comes' programme initiated by the American Red Cross and WW. Grainger Inc. (an industrial supply company). Employees from businesses are trained and mobilised by the Red Cross as a community-based

volunteer force during disasters. In 2011 the programme had 14,000 trained volunteers from more than 460 businesses and organisations in 54 cities [1]. The Red Cross promotes the programme as a way for companies to become involved in their communities, develop their employees' skills, and align with one of the most respected organisations in the USA.

#### 4.3. Digital volunteerism: a new mode

The increasing accessibility of sophisticated yet simple information and communication technologies has enabled citizens to participate in emergency and disaster management in new ways. In particular, widespread use of social media and web-based mapping software has allowed citizens to freely produce and disseminate their own emergency-related information. Examples range from basic use of sites like Facebook to share information through to more complex uses involving data mining and crisis mapping. For example, the 'Pictures and documents found after the April 27, 2011 Tornadoes' Facebook page was set up after a resident of Lester, Alabama, found photos in her yard following the storm. She created the page to enable people to announce if they had lost or found an important item. In the year that the page was operational, around 2000 items were returned to their owners [37]. The page was also used by scientists who examined 934 debris reports for which a clear point of origin and landing could be determined. The study found that objects lofted by tornadoes can travel further than previously thought, with light items travelling as far as 220 miles (354 km) from their point of origin [50].

Meier [55] describes how graduate students at Tufts University in Massachusetts launched a live crisis map within hours of the 2010 Haiti earthquake to document the extent of the damage and the affected population's urgent needs. Information was initially sourced from social media such as Twitter and some mainstream media. However, extensive live coverage of the disaster meant that students soon began crowdsourcing data from several hundred online sources. Hundreds of volunteers from the USA and abroad volunteered to process the data, with the group manually triaging and geo-referencing more than 1,500 reports using the Ushahidi platform (free, open source mapping software). After a few days a SMS short code was set up and integrated with the Ushahidi platform, enabling Haitian people to text in their location and specific needs. With the majority of SMS messages written in Haitian Creole, social media was used to recruit volunteers from the Haitian diaspora who translated around 10,000 messages over the course of the operation. The success of the operation led to the creation of the Standby Task Force, a network of over 1000 volunteers in 80 countries, as well as many other crisis mapping organisations and initiatives [55].

Advances in information and communication technologies have not just enabled mass information dissemination, but also information and knowledge production [52]. Volunteered geographic information (VGI) '... involves the sharing and mapping of spatial data... through voluntary information gathered by the general public' ([38], p. 237). The strength of VGI lies in the notion that information obtained from a group of many observers is likely to be more accurate than that obtained from a single observer. Goodchild and Glennon ([35] p. 235) note that despite concerns about the quality of data produced by 'non-experts' free of institutional and legal frameworks, 'the quality of VGI can approach and even exceed that of authoritative sources'. The rich, contextual information that 'on-the-ground' observers can provide, and the speed with which it can be updated, are key advantages. Nevertheless, there are a number of challenges associated with use of VGI in emergency management. Because it cannot be known beforehand how much information will be volunteered and where it will come from, VGI should be treated as a

supplementary source of information only. Nor can the quality of data cannot be guaranteed, with the potential for citizens to intentionally or unintentionally contribute erroneous information. Citizens may also be biased toward exceptionally large or severe events, meaning that smaller events go unreported [66].

Digital volunteerism is likely to become increasingly prevalent in emergency and disaster management worldwide. A key strength of the crowdsourcing approach is that volunteers do not necessarily have to invest long periods of time to participate, nor do they need to be near the emergency or disaster affected area. The rise of digital volunteerism also means that citizens may participate in emergency and disaster management in other countries.

## 5. Implications for emergency and disaster management

This paper has examined some of the ways citizens participate in emergency and disaster management informally by volunteering their time, knowledge, skills and resources to help others. Research suggests that citizen convergence on emergency and disaster sites is inevitable, so emergency services and other organisations must plan for and manage the participation of these volunteers. This is necessary to reduce the risk that untrained and uncoordinated volunteers will disrupt organised response and reduce the resources available to those who are affected. However, it is also necessary to maximise the effectiveness of emergency and disaster management by drawing on the immense knowledge, skills, resources, networks and enthusiasm of ordinary citizens.

Governments and agencies worldwide are increasingly recognising the opportunities and challenges posed by informal volunteers. Indeed many have developed strategies and resources for engaging and managing them. However, organisational culture, risks and liabilities remain significant barriers to greater involvement of informal volunteers in emergency and disaster management.

### 5.1. Cultures of emergency and disaster management

The extent to which citizens are able to participate in emergency and disaster management depends largely on formal institutional structures and arrangements. Most developed countries employ bureaucratic, command-and-control approaches that originate in the paramilitary roots of emergency and disaster management [59,69]. Command-and-control approaches tend to assume a clear distinction between the pre-emergency and emergency period, with the former characterised by a sense of normalcy and the latter by chaos and disorganisation. Conceived in this way, the role of emergency and disaster organisations is to establish command over chaos and regain control over disorganisation [23]. However, Quarantelli [70] notes that command-and-control rarely works well, even in military combat situations, casting doubt on its applicability and effectiveness in civilian contexts.

Drabek and McEntire [21] identify a range of assumptions that underpin command-and-control approaches: bureaucratic response occurs in a vacuum; information outside of official channels is lacking or inaccurate; standard operating procedures will always function in disasters; departures from bureaucratic guidelines are detrimental; citizens are inept, passive or non-participants in disaster operations; and *ad hoc* emergence is counterproductive. As noted above, disaster research challenges many of these assumptions. It demonstrates that citizens tend to become more cohesive and engage in pro-social behaviour in disaster situations. These findings are the starting point for an alternative approach to emergency and disaster management that involves 'loosening rather than tightening up the command



structure' ([70], p. 381). Emergencies are instead viewed as 'a set of problems which have to be solved with some degree of speed and effectiveness by the existing resources within that social unit – the community' ([23], p. 156). Dynes argues that this problem-solving model rests on a more realistic set of assumptions and principles, derived from empirical research: emergencies do not reduce the capacities of individuals and social structures to cope, but rather present new challenges; existing social structure is the most effective way to address these challenges; social units are resources for problem solving, rather than problems in themselves; and, emergencies are characterised by decentralised and pluralistic decision-making, so autonomy of decision-making should be valued over centralisation of authority. Thus Dynes ([23], p. 149) maintains that an 'open system' is required 'in which the premium is placed on flexibility and initiative among the various social units... and those efforts are coordinated. The goals should be oriented toward problem solving, rather than avoiding chaos'.

The problem solving and command-and-control models broadly align with what Harrald ([36], p. 256) terms 'agility' (creativity, improvisation, adaptability) and 'discipline' (structure, doctrine, process). A degree of discipline is necessary for large organisations to be mobilised and managed; yet agility is needed to ensure broad coordination and communication. Discipline is also needed to ensure the rapid and efficient delivery of services under extreme conditions, while agility is necessary to enable creativity, improvisation and adaptability in the face of uncertainty. Structure and process are needed to ensure the technical and organisational interoperability of emergency and disaster management organisations; however, they must also be flexible enough to interact with and utilise the many spontaneous volunteers and emergent organisations that want to help [36]. This is supported by Boin and t'Hart ([10], p. 366), who argue that 'the circle of organisations actively involved in crisis response networks is [often] drawn too narrowly', focusing largely on established and expanding organisations, with limited participation of extending and emergent organisations.

Stallings and Quarantelli [83] offer five key principles for emergency managers when engaging with emergent groups that are also applicable for managing relationships between emergency managers and informal volunteers. First, they emphasise that emergence is inevitable before, during and after disasters because citizens *will* identify needs that are not being met by emergency or other agencies. These needs may be perceived or real; regardless, emergence is likely to occur. Second, they stress that although emergency agencies may harbour concerns about emergent groups' informal structures, it should be recognised that 'their looseness is one of [their] real strengths' ([83], p. 98). The informal nature of emergent groups means that their efforts to undertake new tasks are not constrained by established procedures, rules or legislation. Third, emergent groups are not always functional, nor are they always dysfunctional. Emergent groups may not be the ideal way to address a particular problem; nevertheless, citizen attempts at resolution should be valued, and it should be acknowledged that there are always alternative approaches. Fourth, it is important to recognise that although groups may emerge due to perceived failings or needs that are not being met by agencies, citizen groups are not always in opposition to public authorities. It is important for emergency managers to engage with these groups positively, and not to assume opposition. Finally, Stallings and Quarantelli insist that emergent phenomena cannot be eliminated through prior planning. Instead, emergency managers should consider what forms of emergent behaviour and groups they might want to facilitate, for example by encouraging existing citizen groups to take on an emergency capability or specific tasks in an emergency.

Some government agencies are quite advanced in their integration of official and unofficial emergency response. Scanlon et al. [77] document the policies and procedures implemented by the Amstelland Safety Region in the Netherlands to make better use of ordinary people's knowledge, skills and capacities in emergency management. Criteria were established to help emergency responders decide whether and how to cooperate with ordinary citizens, existing organisations and emergent groups. The policies explicitly allow emergency responders to accept assistance from ordinary citizens and organisations, provided that: participation is voluntary; the tasks assigned have minimal safety risks; the tasks add value to the overall emergency response; and citizens only fulfil a task when they have the skills and knowledge to complete the task successfully. This more integrated model of emergency management requires official emergency responders to merge with existing social structures and not attempt to re-organise groups and their activities. Official responders are expected to legitimate volunteer activity by enabling access to the affected area, by providing special clothing so that volunteers can be recognised, and by keeping volunteers informed about emergency work. Emergency responders are also expected to identify the 'natural leaders' within volunteer groups and work with them, for example by inviting them to participate in meetings about the progress of the emergency response. These initiatives are built into five planned phases beginning with victims and bystanders arriving on the scene, and ending with official acknowledgement of volunteer efforts and possible provision of counselling and compensation [77].

Implementation of such initiatives may be more complicated in situations where emergency responders are unable to assess whether citizens have the necessary knowledge and skills to make a worthwhile contribution. They may also be unwilling to accept assistance for fear of being held responsible if a volunteer is harmed.

## 5.2. Safety and liability

Sauer et al. [76] note that despite the 'universal presence' of spontaneous volunteers following disasters, few studies have considered related issues of safety and liability. Informal volunteers may risk physical or psychological harm to themselves and others if they engage in activities without necessary knowledge, skills, equipment and training. A survey of 19 organisations identified through the US National Voluntary Organisations Active in Disasters (NVOAD) found that 15 (79%) had encountered spontaneous volunteers during their response activities. 18 (95%) organisations reported that they did not perform background checks on spontaneous volunteers, with just 10 (53%) providing just-in-time training. Two organisations reported a spontaneous volunteer death, while eight reported injuries to volunteers. One organisation had been sued by a spontaneous volunteer and three had been sued due to the actions of a spontaneous volunteer. Only six organisations (32%) believed they were liable for spontaneous volunteers' actions [76].

Orloff [62] identifies two main liability risks for emergency management agencies arising from the participation of spontaneous volunteers. The first is that volunteers or their families will sue agencies for death, injury or damages incurred as a result of volunteer activities, and the second is that recipients of help will sue agencies for the unintended or intended consequences of volunteers' actions. In the USA, confusion about liability stems from complicated laws, inconsistent protections from state to state, and the often multiple affiliations of volunteers that blurs lines of responsibility for protection [62]. Eburn [25] discusses legislation introduced in a number of Australian States to limit the liability of 'Good Samaritans' and voluntary members of community



organisations. These Acts are primarily intended to protect those who respond to medical emergencies where life is threatened, for example by providing first aid or medical care. Importantly, the Acts do not apply to Good Samaritans who act to protect property. Those who provide emergency assistance must act in good faith (i.e. their intention must be to assist the person concerned) and without the expectation of payment or other reward. Although most of the Acts intend to protect volunteers from personal liability, the organisation for which they are volunteering may still be liable [25]. Nevertheless, in her study of spontaneous volunteer management in Victoria, Australia, Saaroni [74] identified very little evidence of governments being sued for the actions of spontaneous volunteers and noted that litigation against volunteers is uncommon.

While further research into legal liability and volunteer safety is needed, the risks associated with informal volunteerism can be minimised. Hospitals routinely manage risks associated with the use of volunteer health professionals during emergencies through prior planning and training to meet surge capacity, and through strict credentialing procedures [42]. Safety can be increased and liability risks reduced through registering, training, credentialing, assigning appropriate tasks, and supervising volunteers [76]. However, such measures are unlikely to be effective where volunteerism is more informal and emergent. Emergency managers must therefore be attuned to what is happening on the ground and be prepared to engage with a diverse range of volunteers.

It is important to recognise that capacities for managing informal volunteers may be limited in countries and regions where government and other institutions are weak or absent. Laws to protect the health and safety of volunteers and recipients of help may also be limited. This was evident in the aftermath of the 2010 Haiti earthquake when a group of ten Baptist missionaries from Idaho in the USA was apprehended attempting to cross the Haiti-Dominican Republic border with 33 children aged two to twelve [5]. The group was part of the New Life Children's Refuge ([60], p. 3), an organisation 'dedicated to rescuing, loving and caring for orphaned, abandoned and impoverished Haitian and Dominican children... [and providing] opportunities for adoption into a loving Christian family'. It was later revealed that many of the children were not abandoned or orphaned. Questions were raised about the intentions of the group, whose leader was experiencing financial difficulty and may have been seeking monetary rewards associated with placing children in adoptive homes. It was also revealed that one of the group's legal advisors was under investigation for alleged connection with sex trafficking in El Salvador [40]. Although uncommon, examples such as this highlight the need to develop capacities and procedures for monitoring and managing the contributions of informal volunteers during emergencies and disasters.

## 6. Conclusion: co-producing emergency and disaster management

Ordinary citizens who volunteer their time, knowledge, skills and resources to help others in times of crisis represent an immense resource for emergency and disaster management. Research reviewed in this paper suggests that unsolicited volunteers will be active in times of crisis, so it is vital that emergency services and other organisations are prepared to cooperate with them and coordinate their activities. This is necessary to ensure effective responses and avoid duplication of effort, but also to prevent volunteers from being put in situations where they may harm themselves or others.

There are many examples of governments, businesses and organisations across the world that are cooperating and coordinating

their activities with informal volunteers. This has typically involved developing volunteer registers and training programmes prior to an event. Yet such measures are unlikely to be effective where volunteerism is highly informal and emergent. It is therefore important that emergency managers are attune to what is happening on the ground and are prepared to engage with a diverse range of volunteers. Attempts to 'integrate' informal volunteers into formal systems may prove counterproductive by quashing the adaptability, innovativeness and responsiveness that informal volunteers bring to emergency and disaster management. Further research is needed to examine how organisational cultures and structures are changing to account for informal volunteerism, and how associated legal liabilities and safety concerns are being managed. Such research is vital if we are to develop more adaptive and inclusive models of emergency and disaster management that harness the capacities and resiliencies that exist within and across communities.

## Acknowledgements:

This paper reports on work funded by the Bushfire & Natural Hazards Cooperative Research Centre (Grant no. T3R14). We thank Georgia Ginnivan and Emma Leitch for their research support. We also thank the journal's referees for their constructive comments and suggestions.

## References

- [1] American Red Cross, Ready When the Time Comes. Available at: (<http://www.redcross.org/supporters/corporate-foundations/ready-when-the-time-comes>), 2014 (last accessed 04.02.15).
- [2] D. Alexander, (2010) The voluntary sector in emergency response and civil protection: review and recommendations. *International Journal of Emergency Management* 7 (2), pp. 151–16.
- [3] A. Apan, D.U. Keogh, D. King, M. Thomas, S. Mushtaq, P. Baddiley, The 2008 floods in Queensland: a case study of vulnerability, resilience and adaptive capacity. Report for the National Climate Change Adaptation Research Facility, Gold Coast, Australia, 2010.
- [4] T. Atsumi, J.D. Goltz, (2014) Fifteen years of disaster volunteers in Japan: a longitudinal fieldwork assessment of a disaster non-profit organization. *International Journal of Mass Emergencies and Disasters* 32 (1), pp.220–240.
- [5] I. Atzet, Post-crisis actions to avoid international child trafficking, *J. Law Fam. Stud.* 12 (2010) 499–510.
- [6] E. Auf der Heide, Convergence behavior in disasters, *Ann. Emerg. Med.* 41 (4) (2003) 463–466.
- [7] Australian Government, *Spontaneous Volunteer Management Resource Kit: Helping to Manage Spontaneous Volunteers in Emergencies*, Commonwealth of Australia, Canberra, 2010.
- [8] J. Barraket, R. Keast, C.J. Newton, K. Walters, E. James, *Spontaneous volunteering during natural disasters*. Queensland University of Technology, Brisbane, 2013.
- [9] A.H. Barton, (1969) *Communities in disaster: a sociological analysis of collective stress situations*. Doubleday, Garden City, New York.
- [10] A. Boin, P. t Hart, *Organising for effective emergency management: lessons from research*, *Aust. J. Public Adm.* 69 (4) (2010) 357–371.
- [11] N.R. Britton, Permanent disaster volunteers: where do they fit, *Nonprofit Volunt. Sect. Q.* 20 (1991) 395–414.
- [12] Cabinet Office, *Improving the UK's ability to absorb, respond to and recover from emergencies (policy)*. Available at: (<https://www.gov.uk/government/policies/improving-the-uks-ability-to-absorb-respond-to-and-recover-from-emergencies>), 2011 (last accessed 04.02.15).
- [13] H. Castanos, C. Lomnitz, *Earthquake Disasters in Latin America: A Holistic Approach*, Springer, Dordrecht, 2012.
- [14] M. Chong, *Employee participation in CSR and corporate identity: insights from a disaster-response program in the Asia-Pacific*, *Corp. Reput. Rev.* 12 (2) (2009) 106–119.
- [15] R.A. Nnaan, F. Handy, M. Wadsworth, *Defining who is a volunteer: Conceptual and empirical considerations*, *Nonprofit Volunt. Sect. Q.* 25 (1996) 364–383.
- [16] Commonwealth of Australia, *National strategy for disaster resilience: building our nation's resilience to disasters*. Available at: ([https://www.coag.gov.au/sites/default/files/national\\_strategy\\_disaster\\_resilience.pdf](https://www.coag.gov.au/sites/default/files/national_strategy_disaster_resilience.pdf)), 2011 (last accessed 04.02.15).
- [17] A. Cottrell, (2010) *Research report: a survey of spontaneous volunteers*. Australian Red Cross, Carlton. [http://www.redcross.org.au/files/ES0-Research\\_report.pdf](http://www.redcross.org.au/files/ES0-Research_report.pdf) (last accessed 19.07.2015).

- [18] Country Fire Authority., Volunteers. Available at: (<http://www.cfa.vic.gov.au/volunteer-careers/volunteers/>), 2015 (last accessed 15.06.15).
- [19] P. Dekker, L. Halman, Volunteering and values: an introduction, in: P. Dekker, L. Halman (Eds.), *The Values of Volunteering: Cross-Cultural Perspectives*, Kluwer Academic/Plenum Publishers, New York, 2003, pp. 1–17.
- [20] Department of Human Services, Register for clean-up and recovery projects. Available at: (<http://emergency.volunteer.vic.gov.au/>), 2014 (last accessed 15.06.15).
- [21] T.E. Drabek, D.A. McEntire, Emergent phenomena and the sociology of disaster: lessons, trends and opportunities from the research literature, *Disaster Prev. Manag.* 12 (2) (2003) 97–112.
- [22] R.R. Dynes, *Organized Behavior in Disaster*, Lexington Books, Lexington, MA, 1970.
- [23] R.R. Dynes, Community emergency planning: false assumptions and inappropriate analogies, *Int. J. Mass Emerg. Disasters* 12 (1994) 141–158.
- [24] R.R. Dynes, E.L. Quarantelli, D. Wenger, Individual and organizational response to the 1985 earthquake in Mexico City, Mexico. Book & Monograph Series No. 24. Disaster Research Center, University of Delaware. Delaware, 1990.
- [25] M. Eburn, (2003) Protecting volunteers? *Australian Journal of Emergency Management* 18 (4), pp.7–11.
- [26] Emergency Management Australia (EMA), *Australian Emergency Management Glossary. Manual 03*, Attorney-General's Department, Australian Government, Canberra, 1998.
- [27] Federal Emergency Management Agency (FEMA), A whole of community approach to emergency management: principles, themes, and pathways for actions. Available at: ([http://www.fema.gov/media-library-data/20130726-1813-25045-0649/whole\\_community\\_dec2011\\_2\\_.pdf](http://www.fema.gov/media-library-data/20130726-1813-25045-0649/whole_community_dec2011_2_.pdf)), 2011 (last accessed 04.02.15).
- [28] Federal Emergency Management Agency (FEMA), Volunteer and donations management support annex. Available at: ([http://www.fema.gov/media-library-data/20130726-1914-25045-9213/nrf\\_support\\_annex\\_volunteer\\_20130505.pdf](http://www.fema.gov/media-library-data/20130726-1914-25045-9213/nrf_support_annex_volunteer_20130505.pdf)), 2013 (last accessed 04.02.15).
- [29] Federal Emergency Management Agency (FEMA), Glossary. Available at: (<http://emilms.fema.gov/IS700aNEW/glossary.htm>), 2014 (last accessed 04.02.15).
- [30] Federal Emergency Management Agency (FEMA), Community Emergency Response Teams. Available at: (<https://www.fema.gov/community-emergency-response-teams>), 2015 (last accessed 15.06.15).
- [31] L.S. Fernandez, J.A. Barbera, J.R. van Dorp, Spontaneous volunteer response to disasters: the benefits and consequences of good intentions, *J. Emerg. Manag.* 4 (5) (2006) 57–68.
- [32] C.B. Field, et al., Managing the risks of extreme events and disasters to advance climate change adaptation. Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC), Cambridge University Press, Cambridge, 2012.
- [33] C. Fishwick, Tomnod – the online search party looking for Malaysian Airlines flight MH370. Available at: (<http://www.theguardian.com/world/2014/mar/14/tomnod-online-search-malaysian-airlines-flight-mh370>), 2014 (last accessed 04.02.15).
- [34] C.E. Fritz, J.H. Mathewson, Convergence behaviour in disasters: a problem of social control. Publication 476. Committee on Disaster Studies, National Academy of Sciences – National Research Council. Washington DC, 1957.
- [35] M.F. Goodchild, J.A. Glennon, Crowdsourcing geographic information for disaster response: a research frontier, *Int. J. Digit. Earth* 3 (3) (2010) 231–241.
- [36] J.R. Harrald, Agility and discipline: critical success factors for disaster response, *Ann. Am. Acad. Polit. Soc. Sci.* 604 (2006) 256–272.
- [37] K. Harrison, 'I just can't throw them away': Patty Bullion made Facebook page to help return heirlooms to families. Available at: (<http://www.timesfreepress.com/news/2013/apr/27/i-just-cant-throw-them-away/>) 2013 (last accessed 04.02.15).
- [38] B. Haworth, E. Bruce, A review of volunteered geographic information for disaster management, *Geogr. Compass* 9 (5) (2015) 237–250.
- [39] K. Haynes, D. Bird, D.B. Carson, Indigenous experiences and responses to Cyclone Tracy, in: J. Palutikof, S. Boulter, J. Barnett, D. Rissik (Eds.), *Applied Studies in Climate Adaptation*, Wiley Blackwell, Oxford, 2015, pp. 297–306.
- [40] A. Hearst, Between Restavek and relocation: children and communities in transnational adoption, *J. Hist. Child. Youth* 3 (2) (2010) 267–292.
- [41] I. Helsloot, A. Ruitenber, Citizen response to disasters: a survey of literature and some practical implications, *J. Conting. Crisis Manag.* 12 (3) (2004) 98–111.
- [42] J.G. Hodge, Legal triage during public health emergencies and disasters, *Adm. Law Rev.* 58 (3) (2006) 627–644.
- [43] J. Holguin-Veras, M. Jaller, L.N. Van Wassenhove, N. Perez, T. Wachtendorf, Material convergence: important and understudied disaster phenomenon, *Nat. Hazards Rev.* 15 (2012) 1–12.
- [44] J.-Y. Hur, Disaster management from the perspective of governance: case study of the Hebei Spirit oil spill, *Disaster Prev. Manag.* 21 (3) (2012) 288–298.
- [45] B.R. Johnson, E. Connolly, T.S. Carter, Corporate social responsibility: the role of Fortune 100 companies in domestic and natural disasters, *Corp. Soc. Responsib. Environ. Manag.* 18 (2011) 352–369.
- [46] I. Kelman, J. Mercer, J.C. Gaillard, Indigenous knowledge and disaster risk reduction, *Geography* 97 (2012) 12–21.
- [47] J. Kendra, T. Wachtendorf, Reconsidering convergence and converger legitimacy in response to the World Trade Center disaster, *Res. Soc. Probl. Public Policy* 11 (2003) 97–122.
- [48] J. Kendra, T. Wachtendorf, Community innovation and disasters, in: H. Rodríguez, E.L. Quarantelli, R.R. Dynes (Eds.), *Handbook of DISASTER Research*, Springer, New York, 2007, pp. 316–334.
- [49] L. Kerr, H. Savelsburg, S. Sparrow, D. Tedmanson, Experiences and perceptions of volunteering in indigenous and non-English speaking background communities. Available at: (<https://atn.edu.au/Documents/EASS/HRI/SPRG/volunteering-report.pdf>) 2001 (last accessed 14.07.15).
- [50] J.A. Knox, J.A. Rackley, A.W. Black, V.A. Gensini, M. Butler, C. Dunn, T. Gallo, M. R. Hunter, L. Lindsey, M. Phan, R. Scroggs, S. Brustad, Tornado debris characteristics and trajectories during the 27 April 2011 super outbreak as determined using social media data, *Bull. Am. Meteorol. Soc.* 94 (9) (2013) 1371–1380.
- [51] S. Liath, Averting a disaster within a disaster: the management of spontaneous volunteers following the 11 September 2001 attacks on the World Trade Center in New York, *Volunt. Action* 6 (2) (2004) 11–29.
- [52] D. Linders, From e-government to we-government: defining a typology for citizen co-production in the age of social media, *Gov. Inf. Q.* 29 (4) (2012) 446–454.
- [53] B.G. McAdoo, A. Moore, J. Baumwoll, Indigenous knowledge and the near field population response during the 2007 Solomon Islands Tsunami, *Nat. Hazards* 48 (2009) 73–82.
- [54] J. Mercer, I. Kelman, L. Taranis, S. Suchet-Pearson, Framework for integrating indigenous and scientific knowledge for disaster risk reduction, *Disasters* 34 (1) (2009) 214–239.
- [55] P. Meier, Human computation for disaster response, in: P. Michelucci (Ed.), *Handbook of Human Computation*, Springer, New York, 2013, pp. 95–104.
- [56] D.J. Mendonca, W.A. Wallace, A cognitive model of improvisation in emergency management, *IEEE Trans. Syst. Man Cybern. – Part A: Syst. Hum.* 37 (4) (2007) 547–561.
- [57] A. Muller, R. Kräussl, Doing good deeds in times of need: a strategic perspective on corporate disaster donations, *Strateg. Manag. J.* 32 (2011) 911–929.
- [58] A. Muller, G. Whiteman, Exploring the geography of corporate philanthropic disaster response: a study of Fortune Global 500 firms, *J. Bus. Ethics* 84 (2009) 589–603.
- [59] D. Neal, B. Phillips, Effective emergency management: reconsidering the bureaucratic approach, *Disasters* 19 (1995) 327–337.
- [60] New Life Children's Refuge (NLCR), New Life Children's Refuge: Haitian Orphan Rescue Mission. Available at: (<http://www.esbctwinfalls.com/clientimages/24453/pdffiles/haiti/nlcrhaitianorphanrescuemission.pdf>) 2010 (last accessed 25.06.15).
- [61] E.K. Noji, Earthquakes, in: E.K. Noji (Ed.), *The Public Health Consequences of Disasters*, Oxford University Press, New York, 1997, pp. 135–178.
- [62] L. Orloff, *Managing Spontaneous Community Volunteers in Disasters: A Field Manual*, CRC Press, Boca Raton, FL, 2011.
- [63] L.A. Penner, Volunteerism and social problems: making things better or worse, *J. Soc. Issues* 60 (3) (2004) 645–666.
- [64] R.W. Perry, M.K. Lindell, Understanding citizen response to disasters with implications for terrorism, *J. Conting. Crisis Manag.* 11 (2003) 49–60.
- [65] J.A. Piliavin, E. Siegl, Health benefits of volunteering in the Wisconsin longitudinal study, *J. Health Soc. Behav.* 48 (December) (2007) 540–546.
- [66] K. Poser, D. Dransch, Volunteered geographic information for disaster management with application to rapid flood damage estimation, *Geomatica* 64 (1) (2010) 89–98.
- [67] E.L. Quarantelli, Organizations under stress, in: R. Bricton (Ed.), *Symposium on Emergency Operations Systems*, Development Corporation, Santa Monica, CA, 1966, pp. 3–19.
- [68] E.L. Quarantelli, Emergent citizen groups in disaster preparedness and recovery activities. Final project report no. 33. Disaster Research Centre, University of Delaware. Delaware, 1984.
- [69] E.L. Quarantelli, (1987) Disaster studies: an analysis of the social historical factors affecting the development of research in the area. *International Journal of Mass Emergencies and Disasters* 5 (3), pp.285–310.
- [70] E.L. Quarantelli, Disaster crisis management: a summary of research findings, *J. Manag. Stud.* 25 (4) (1988) 373–385.
- [71] E.L. Quarantelli, Organizational response to the Mexico City Earthquake of 1985: characteristics and implications, *Nat. Hazards* 8 (1993) 19–38.
- [72] D. Robinson, T. Williams, Social capital and voluntary activity: giving and sharing in Maori and non-Maori society, *Soc. Policy J. N. Z.* 17 (2001) 52–71.
- [73] G.A. Ross, (1979) Organizational innovation in disaster settings. Preliminary Paper no. 24. Disaster Research Center, University of Delaware, Delaware.
- [74] L. Saaroni, Managing spontaneous volunteers in emergencies: a qualitative risk-benefit assessment model for local governments in Victoria, Australia (Unpublished M.Sc. thesis). University of Leicester. Leicester, 2014.
- [75] Salvation Army, About the Salvation Army. Available at: (<http://www.salvationarmyusa.org/usn/about>) 2014 (last accessed 04.02.15).
- [76] L.M. Sauer, C. Catlett, R. Tosatto, T.D. Kirsch, The utility and risks associated with the use of spontaneous volunteers in disaster response: a survey, *Disaster Med. Public Health Prep.* 8 (1) (2014) 65–69.
- [77] J. Scanlon, I. Helsloot, J. Groenendaal, Putting it all together: integrating ordinary people into emergency response, *Int. J. Mass Emerg. Disasters* 32 (1) (2014) 43–63.
- [78] L. Shaskolsky, Volunteerism in disaster situations. Preliminary paper no. 1. Disaster Research Center, University of Delaware, Delaware, 1967.
- [79] R. Shaw, K. Goda, From disaster to sustainable civil society: the Kobe experience, *Disasters* 28 (1) (2004) 16–40.

- [80] K. Smith, H. Hamerton, S. Hunt, R.J. Sargisson, Local volunteers respond to the Rena oil spill in Maketu, New Zealand, *New Zealand Journal of Social Sciences Online*. Kōtuitui, 2015. <http://dx.doi.org/10.1080/1177083X.2015.1009474>.
- [81] R.M. Smith, G.S.M. Dyer, K. Antonangeli, N. Arredondo, H. Bedlion, A. Dalal, G. M. Deveny, G. Joseph, D. Lauria, S.H. Lockhart, S. Lucien, S. Marsh, S.O. Rogers, H. Salzarulo, S. Shah, R.J. Toussaint, J. Wagoner, Disaster triage after the Haitian earthquake, *Injury* 43 (2012) 1811–1815.
- [82] M. Snyder, A.M. Omoto, Volunteerism: social issues perspectives and social policy implications, *Soc. Issues Policy Rev.* 2 (1) (2008) 1–36.
- [83] R.A. Stallings, E.L. Quarantelli, Emergent citizen groups and emergency management, *Public Adm. Rev.* 45 (1985) 93–100.
- [84] J. Twigg, Corporate social responsibility and disaster reduction: a global overview. Available at: (<http://drr.upeace.org/english/documents/References/Topic%207-Preparedness-%20Early%20Warning,%20Planning,%20Monitoring%20and%20Evaluation/Twigg%202001%20CSR%20and%20disaster%20management.pdf>) 2001 (last accessed 04.02.15).
- [85] United Nations Development Programme (UNDP), State of the world's volunteerism report: universal values for global well-being. Available at: ([http://www.unv.org/fileadmin/docdb/pdf/2011/SWVR/English/SWVR2011\\_full.pdf](http://www.unv.org/fileadmin/docdb/pdf/2011/SWVR/English/SWVR2011_full.pdf)) 2011 (last accessed 04 .02.15).
- [86] United Nations Development Programme (UNDP), UN and Deutsche Post DHL sign new 3-year agreement for disaster resilience. Available at: (<http://www.undp.org/content/undp/en/home/presscenter/articles/2014/06/11/un-and-dhl-use-airport-terminals-to-make-disasters-less-terminal.html>) 2014 (last accessed 23.06.15).
- [87] United Nations International Strategy for Disaster Reduction (UNISDR), Hyogo framework for action 2005–2015: building the resilience of nations and communities to disasters. Available at: ([http://www.unisdr.org/files/1037\\_hyogoframeworkforactionenglish.pdf](http://www.unisdr.org/files/1037_hyogoframeworkforactionenglish.pdf)) 2007 (last accessed 04.02.15).
- [88] M. Villemure, T.M. Wilson, D. Bristow, M. Gallagher, S. Giovinazzi, C. Brown, Liquefaction ejecta clean-up in Christchurch during the 2010–2011 earthquake sequence. 2012 NZSEE Conference, Christchurch, April 2012. Available at: ([http://ir.canterbury.ac.nz/bitstream/10092/7285/1/12641199\\_Villemure%20et%20al.%202012%20-%20NZSEE%20Paper131\\_15042012.pdf](http://ir.canterbury.ac.nz/bitstream/10092/7285/1/12641199_Villemure%20et%20al.%202012%20-%20NZSEE%20Paper131_15042012.pdf)) 2012 (last accessed 13.07.15).
- [89] Wangaratta Four Wheel Drive Club, Track Torque: March 2009 newsletter. Available at: ([http://www.wangaratta4x4club.org.au/wp-content/uploads/2014/05/2009\\_03-1.pdf](http://www.wangaratta4x4club.org.au/wp-content/uploads/2014/05/2009_03-1.pdf)) 2009 (last accessed 06.02.15).
- [90] G.R. Webb, F.-R. Chevreau, Planning to improvise: the importance of creativity and flexibility in crisis response, *Int. J. Emerg. Manag.* 3 (1) (2006) 66–72.
- [91] R. Webber, K. Jones, After the bushfires: surviving and volunteering, *Aust. J. Emerg. Manag.* 26 (2) (2011) 33–38.
- [92] J. Whittaker, J. Handmer, D. Mercer, Vulnerability to bushfires in rural Australia: a case study from East Gippsland, Victoria, *J. Rural Stud.* 28 (2) (2012) 161–173.
- [93] J. Wilson, Volunteerism, *Annu. Rev. Sociol.* 26 (1) (2000) 215–240.
- [94] J. Wilson, Volunteerism research: a review essay, *Nonprofit Volunt. Sect. Q.* 41 (2) (2012) 176–212.
- [95] J. Wilson, M. Musick, Who cares? Toward an integrated theory of volunteer work, *Am. Sociol. Rev.* 62 (5) (1997) 694–713.
- [96] R.P. Wolensky, Toward a broader conceptualization of volunteerism in disaster, *Nonprofit Volunt. Sect. Q.* 8 (1979) 33–42.
- [97] R. Zhang, Z. Rezaee, J. Zhu, Corporate philanthropic disaster response and ownership type: evidence from Chinese firms' response to the Sichuan earthquake, *J. Bus. Ethics* 91 (2009) 51–63.